APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/383,115	08/25/1999	PETER H. VAN DER VEEN	21336-703	6121

7590   04/14/2004

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EXAMINER
AVELLINO, JOSEPH E

ART UNIT	PAPER NUMBER
2143	

DATE MAILED: 04/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *29 March 2004*.
2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *17-29* is/are pending in the application.
   4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) *17-29* is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All   b) ☐ Some * c) ☐ None of:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____.
      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____ .

DETAILED ACTION

1.   Claims 17-29 are pending in this examination.

Claim Rejections - 35 USC § 102

2.   The text of those sections of Title 35, U.S. Code not included in this action can

be found in a prior Office action.

Claims 17, and 23-28 are rejected under 35 U.S.C. 102(b) as being anticipated

by Kleiman (USPN 5,515,38) (cited as prior art not relied upon in previous Office

Action).

3.   Referring to claim 17, Kleiman discloses a method of symmetric processing for

an inter-process control (IPC) message-passing operating system (SunOS 5.0

supporting multiprocessors symmetrically, message-passing between processes is an

inherent feature of SunOS; col. 4, lines 32-44 and col. 5, lines 35-55) where operating

system calls execute in critical and non-critical areas (i.e. sections), said method

comprising the steps of:

responding to an operating system call requiring access to a critical area of said

IPC operating system by:

requesting a global lock (raising priority level of thread) (col. 11, lines 39-67);

responding to said global lock being available by performing the steps of:

acquiring said global lock (i.e. not allowing any other interrupt or thread access to

a critical section before the current thread or interrupt has completed execution of the

critical section of code by raising priority level high enough such that no other thread ma

preempt the current thread) (col. 12, lines 2-11);

performing operating system call in said critical area (interrupt handler) of said

IPC operating system (col. 12, lines 53-55); and

releasing said global lock (it is inherent that when an interrupt handler thread is

finished, it is destroyed, thereby releasing the global lock and allowing other interrupts

and threads to execute);

responding to said operating system call requiring access to a non-critical area of

said IPC operating system by:

performing said operating system call in said non-critical area of said IPC

operating system (it is inherent that other threads can call to non-critical areas of an

operating system to execute instructions which are not time-critical or are standard

system-wide processes such as garbage collection, statistics monitoring, periodic

deadlock detecting, etc.).

4.   Claims 23-26 are rejected for similar reasons as stated above. Furthermore

Kleiman discloses a computer system comprising one or more processors (Figure 1) as

well as a memory medium storing an operating system (Figure 1).

5.   Referring to claim 27, Kleiman discloses performing an IPC message-pass

operation for said operating system call (an IPC message-pass operation can be

broadly construed to mean notifying the operating system to execute the critical area)

(Figure 9 and pertinent portions of the disclosure).

6.   Claim 28 is rejected for similar reasons as stated above. Furthermore it is

inherent that a second iteration of the method described in Kleiman would yield the

same result as the first iteration, therefore meeting the limitations of the aforementioned

claim.

Claim Rejections - 35 USC § 103

7.   The text of those sections of Title 35, U.S. Code not included in this action can

be found in a prior Office action.

Claims 18-20, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Kleiman in view of Dangelo (USPN 5,946,487).

8.   Referring to claim 18, Kleiman discloses a method of symmetric multiprocessing

as stated in the claims above. Kleiman does not specifically state that the operating

system is a micro kernel operating system. Dangelo discloses another operating

system which provides mutual exclusion of critical code areas which does include a

micro-kernel operating system (col. 8, lines 21-40; Figure 2). It would be obvious to a

person of ordinary skill in the art at the time the invention was made to combine the

teaching of Dangelo with Kleiman to provide for better alignment of program threads "on

the fly" to better synchronize operations and reduce processor overhead while still

providing the same functionality to the user and user threads as supported by Dangelo

(col. 8, lines 26-35).

9.   Referring to claim 19, Kleiman discloses a method of symmetric multiprocessing

as stated in the claims above. Kleiman further discloses the operating system kernel is

a pre-emptable kernal which pre-empts any non-critical threads (i.e. any threads with a

lower priority than the current thread) prior to acquiring the global lock (col. 6, lines 56 to

col. 7, line 5; col. 12, line 52-54; col. 13, line 61 to col. 14, line 20); and

        reinstating said pre-empted threads following said step of releasing said global

lock (it is in inherent feature that any halted thread will be reinstated since the thread

must execute to complete).

        Kleiman does not specifically state that the operating system is a micro kernel

operating system. Dangelo discloses another operating system which provides mutual

exclusion of critical code areas which does include a micro-kernel operating system

(col. 8, lines 21-40; Figure 2). It would be obvious to a person of ordinary skill in the art

at the time the invention was made to combine the teaching of Dangelo with Kleiman to

provide for better alignment of program threads "on the fly" to better synchronize

operations and reduce processor overhead while still providing the same functionality to

the user and user threads as supported by Dangelo (col. 8, lines 26-35).

10.   Claim 20 is rejected for similar reasons as stated above.

11.   Referring to claim 29, Kleiman discloses a method of symmetric processing as
stated in the claims above. Kleiman further discloses performing an operating system
call in a non-critical area of the IPC operating system by performing an external process
for said operating system call (system calls) (col. 1, line 65 to col. 2, line 31). Kleiman
does not specifically state that the operating system is a micro kernel operating system.
Dangelo discloses another operating system which provides mutual exclusion of critical
code areas which does include a micro-kernel operating system (col. 8, lines 21-40;
Figure 2). It would be obvious to a person of ordinary skill in the art at the time the
invention was made to combine the teaching of Dangelo with Kleiman to provide for
better alignment of program threads "on the fly" to better synchronize operations and
reduce processor overhead while still providing the same functionality to the user and
user threads as supported by Dangelo (col. 8, lines 26-35).

       Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over
Kleiman in view of Dangelo in view of Jones et al. (USPN 5,812,844) (hereinafter
Jones).

12.   Referring to claim 11, Kleiman in view of Dangelo disclose a method of
symmetric processing as stated in the claims above. Kleiman in view of Dangelo do not

disclose prioritizing execution of threads in accordance with how their respective call latencies will impact real time operation. In analogous art, Jones discloses another method of process scheduling which discloses prioritizing execution of threads in accordance with how their respective call latencies will impact real time operation (col. 5, lines 57-67). It would be obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Jones with Kleiman and Dangelo to reduce scheduling overhead processing and further increase scheduling efficiency by increasing throughput of tasks while not allowing the overall thread wait to become unproductive.

13. Referring to claim 12, Kleiman in view of Dangelo disclose a method of symmetric processing as stated in the claims above. Kleiman in view of Dangelo do not disclose scheduling execution of said threads to be performed by predetermined time deadlines. Jones disclsoses scheduling execution of threads in a multitasking operating system to be performed by predetermined time deadlines (time-specific scheduling constraint) (col. 7, lines 27-31). It would be obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Jones with Kleiman and Dangelo to allow for time-specific scheduling and increase performance for modern multimedia applications as supported by Jones (col. 2, lines 50-53).

Response to Amendment

14.   Applicant's arguments filed March 29, 2004 have been fully considered but they are not persuasive.

15.   In the remarks, Applicant argues in substance that (1) Kleiman does not disclose an operating system which requires access to both critical and non-critical areas as well as an IPC message passing operating system, rather a monolithic operating system wherein all threads are executed as part of the kernel.

16.   As to point (1), it is an inherent feature that the SunOS operating system is an IPC message passing operating system which discloses threads which require access to both critical and non-critical areas of the operating system. An example of such an operating system can be found in Powell, M. L. et al, "SunOS Multi-thread Architecture" USENIX, Winter 1991, Dallas, TX. By this rationale the rejection is maintained.

Conclusion

17.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

18.   Eykholt, J.R. et al. "Multithreading: Beyond Multiprocessing-Multithreading the SunOS Kernel", USENIX, Summer 1992, San Antonio, TX.

19.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Joseph E. Avellino whose telephone number is (703)

305-7855. The examiner can normally be reached on Monday-Friday 7:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, David A. Wiley can be reached on (703) 308-5221. The fax phone number

for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to the receptionist whose telephone number is (703) 305-
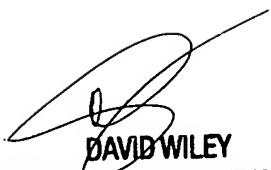
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JEA

April 7, 2004

DAVID WILEY
SUPERVISORY PATENT EXAMINER
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